1. Introduction

1.1 State-Owned Enterprises

Currently, there are six energy-related state enterprises, i.e.

- Electricity Generating Authority of Thailand (EGAT)
- Metropolitan Electricity Authority (MEA)
- Provincial Electricity Authority (PEA)
- Petroleum Authority of Thailand (PTT)
- PTT Exploration and Production Co.,Ltd. (PTTEP)
- Bangchak Petroleum Public Co., Ltd. (Bangchak)

1.2 Current Government Participation

Additionally, the energy-related businesses which are not state enterprises but in which the government or state enterprises hold shares include:

- **Thai Oil Co**.: PTT holds 49%.
- **Electricity Generating Public Co., Ltd. (EGCO)**: EGAT holds 25.8%.
- **Fuel Pipeline Transportation Co., Ltd. (FPT)**: PTT, Bangchak, Thai Airways International Public Co., Ltd. and Airports Authority of Thailand altogether hold 44%.
- **Thai Petroleum Pipeline Co., Ltd. (THAPPLINE)**: PTT holds 30.6%.
- **Thai LNG Power Co., Ltd. (TLPC)**: PTT holds 40%.
- **Esso (Thailand) Public Co., Ltd.**: the Ministry of Finance holds 12.5%.
- **Rayong Refinery Company (RRC)**: PTT holds 36%.
- **Star Petroleum Refining Co., Ltd. (SPRC)**: PTT holds 36%.
- **Bangkok Aviation Fuel Services Co., Ltd. (BAFS)**: PTT, Thai Airways and, Airports Authority of Thailand hold 49%.

This list excludes a number of petrochemical companies in which PTT is also a shareholder, for example, National Petrochemical Public Co., Ltd. and Thai Olefins Co., Ltd. (TOC).

2. Previous Implementation

The following measures have been implemented to promote a greater role of the private sector in the energy industry:

2.1 Public Offerings

Shares of the following companies were listed on the Stock Exchange of Thailand (SET), resulting in the dilution of the government/state enterprises to the following proportion:

1. **PTTEP**: PTT's shareholding has been diluted to 60.7%.

2. **EGCO**: EGCO purchased Rayong Power Plant and Khanom Power Plant from EGAT and listed its shares on the SET. At present, EGAT's shareholding is 25.8%.

3. **Bangchak**: Its shares were listed on the SET by diluting the government's shareholding to 80%. The current shareholding structure is as follows:

Shareholding Structure of Bangchak	
Ministry of Finance	48%
Krung Thai Bank	8%
PTT	24%
General public in the SET	20%
Total	**100%**

Figure 1: Shareholding Structure of Bangchak

2.2 IPP's and SPP's

The electricity supply industry is now being deregulated to allow private sector investment in power generation projects, in the form of both IPP's and SPP's, and to sell electricity to EGAT. To date, EGAT is expected to purchase power from seven IPP projects, with a total capacity of 5,944 MW, and from approximately 55 SPP projects, with an estimated total sale of 2,500 MW. Power purchase from IPP's and SPP's will result in the reduction of EGAT's required investment in power generation by approximately 300,000 million baht.

2.2.1 Small Power Producer (SPP)

SPPs are small power projects that are either cogenerators or facilities using renewable energy as fuel, which sell power to EGAT of not more than 90 MW for each project. Since each SPP can sell power directly to consumers located in its vicinity, its generating capacity is therefore very often as large as 120-150 MW. A number of SPPs are really Independent Power Producers (IPPs) disguised as cogenerators. Since 1991, 92 proposals have been received by EGAT but some projects have been rejected while some have withdrawn particularly after the baht flotation in July 1997. At present 51 power purchase agreements (PPA) with EGAT have been signed and another 6 PPAs are under negotiation. If all projects are completed then the total purchase would amount to 2,445 MW.

As of December 1998, thirty-one SPPs were already in operations selling 740 MW of power to EGAT, and a number of other projects at various stages of development. After the baht depreciation in July 1997 the government amended the terms and conditions for the SPPs particularly by indexing a part of the capacity payment to the exchange rate in order to cushion the impact of the economic crisis. The amendment of the PPA has helped a number of SPPs to obtain financial closing on their projects thereby allowing them to proceed and complete the projects. However a number of projects still face financing problems and it is possible that up to 11 projects will not be to completed. Under this worse case scenario EGAT would be buying power from 44 SPPs with total purchase amounting to 1,730 MW.

	Number of Projects	Generating Capacity (MW)	Sale to EGAT (MW)
Commercial Energy			
Natural Gas	23	2,988	1,678
Fuel Oil	1	10	9
Coal	10	1,210	618
Sub Total	34	4,208	2,305
Renewable Energy			
Bagasse	14	301	67.5
Paddy Husk, Wood chips, Saw dust	6	144.3	57
Municipal Waste	1	3	1
Biogas	1	0.06	0.045
Black Liquor	1	32.9	25
Sub Total	23	481	150
Total	**57**	**4,689**	**2,455**

Figure 2: SPP Proposals Accepted Classified by Type of Fuel as of December 1998

A number of prominent Thai companies are involved in SPP projects for instance Banpu, Advance Agro, Thai Oil, TPI, Bangkok Industrial Gas, EGCO, Hemaraj, Sahapatanapubul and Bangpakong Industrial Park. Many international companies also play significant roles in the SPP business in Thailand. These include

- Sithe Pacific (USA)
- CMS
- Imatran Voima Oy (Finland)
- Air Products (USA)
- Tractebel (Belgium)
- Marubeni (Japan)

The economic crisis has also greatly affected the Thai shareholders in SPP projects forcing them to seek new partners. A number of international companies have recently decided to participate in SPP projects, for instance CMS (USA) and National Power (UK).

2.2.2 Independent Power Producer (IPP)

The first round of IPP solicitation was issued in December of 1994 whereby EGAT would buy up to 5,800 MW of capacity from IPPs for the period 1996-2003. Power Purchase Agreements (PPAs) has been signed with 7 IPPs with a total of 5,944 MW of electricity sold to EGAT.

Company	Investor	Capacity (MW)	COD	Fuel Used
Phase I (1996-2000)				
1. Independent Power (Thailand) Co., Ltd. (IPT)	Thaioil 56% Unocal 24% Westinghouse 20%	700	Sep 99	Natural gas
2. Eastern Power & Electric Co., Ltd. (Bang Bo) (EPEC)	GMS Power Plc 67% Marubeni 33%	350	31 Jan 2002	Natural gas
3. Tri Energy Co., Ltd. (TECO)	Banpu 37.5% Texaco 37.5% Edison Mission Energy 25%	700	July 2000	Natural gas
Phase II (2001-2003)				
1. Union Power Development Co., Ltd.	Union Energy 10% Tomen 34% Imatran Voima Oy 28% Consolidated Electric Power Asia (CEPA) 28%	1,400	Unit 1 1 Oct 2002 Unit 2 1 Jan 2003	Coal
2. Bowin Power Co., Ltd.	Hemaraj 50% Tractebel 50%	713	1 April 2002	Natural gas
3. BLCP Power Limited	Banpu 47.5% Loxley 5% PowerGen 47.5%	1,346.5	Unit 1 1 Oct 2002 Unit 2 1 Feb 2003	Coal
4. Gulf Power Generation Co., Ltd.	Gulf Electric 60% Mission Energy 40%	734	Unit 1 1 Oct 2002 Unit 2 1 April 2003	Coal
Total		5,943.5		

Figure 3: Thailands's IPP Awards

The baht flotation in July 1997 was considered as a “change in law”, PPAs were, therefore, amended which significantly helped IPPs to proceed with their projects. At this stage, 2 IPP projects have been able to obtain financial close while the other five IPPs are in the process of obtaining financing. The economic problems have resulted in re-negotiations for the commercial operation date. These negotiations were carried out between May – June 1998 and the results were approved by Cabinet on 16 February 1999, except for BLCP where the negotiation for a 2-4 year delay has not been concluded.

Certain changes in the shareholding structure have taken place, for instance Black & Veatch withdrew from TECO and has been replaced by Mission Energy, Union Energy has reduced its share holding in Union Power in order to bring in CEPA, and Rio Tinto withdrew from BLCP.

The main concern of the financial institutions in providing financing is related to the ability of EGAT to uphold its commitment under the PPA’s as EGAT’s financial position could deteriorate if:

- the economic slow down causes significant slow down in power demand growth resulting in a very high level of reserve margin of the system;
- the government, due to political reasons, does not allow EGAT to adjust the retail power tariff.

It has been pointed out that EGAT's power development plan has been adjusted by delaying a number of projects while a number of private power projects are facing delays so the reserve margin would not be excessive. Moreover the adjustment in the tariff is automatic and does not require government approval. Since the baht flotation, the tariff has been adjusted four times to reflect the increase in the fuel cost and the cost of debt. The tariff increased on three occasions between November 1997 and November 1998. The fourth tariff adjustment in December 1998, saw a decrease by 5.08 satang per kWh.

2.3 Power Purchase from Neighbouring Countries

As with the IPP and SPP program, this initiative will substantially reduce the investment burden of EGAT. The following programs have been implemented:

2.3.1 Lao PDR

A purchase capacity of 3,000 MW is expected by 2006 according to a Memorandum of Understanding (MOU) jointly signed by the two countries. To date, Power Purchase Agreements (PPA) have been signed for two projects: Nam Theun Hinboun (187 MW) and Houay Ho (126 MW) with PPA's for another three projects under negotiation.

Project	Sale (MW)	Investors	Commissioning Date
Projects with PPA			
Nam Theun-Hinboun	187	Lao PDR, Nordic, MDX	March. 1998
Houay Ho	126	Lao PDR, Daewoo, Loxley	September 1999
Sub-Total	313		
Projects with MOU and PPA Under Negotiation			
Hongsa Lignite (Stage 1 & 2)	608	Thai-Lao Lignite	2006 or 2008*
Nam Ngum 3	430	Lao PDR, MDX	2006 or 2008*
Nam Ngum 2	553	SHLAPAK, BILFINGER & BERGER, VOITH, NOELL, SIEMENS, CH. KARNCHANG, SRI U-Thong – COD 2006 or 2008*	
Sub-Total	1,591		
Projects under Negotiation			
Nam Theun 2	900	Lao PDR, Transfield, EDF, ITALTHAI JASMINE, PHATRA - COD 2006*	
Xe Kaman 1	407	Lao PDR, HECCE, SRI-U-Thong – COD 2006 or 2008*	
Xepian – Xenamnoi	365	Dong Ah Construction, Thai-Lao Hydro Power, Intertrade Co., Ltd. – COD 2006 or 2008*	
Sub-Total	1,672		
Grand Total	**3,576**		

*Under EGAT PDP 99-01, EGAT plans to postpone power purchase from Lao PDR and will purchase 1600 MW in December 2006 and 1700 MW in March 2008.

Figure 4: Power Purchase from Lao PDR

Nam Theun Hinboun was commissioned on 31 March 1998 as scheduled. Houay Ho has recently been completed and will be commissioned in September 1999 as scheduled when the transmission line is completed.

The PPA for Hongsa Lignite was agreed in December 1997, but the project developer has asked for renegotiation of the tariff due to the baht floatation. The amendment of the PPA will need to include a delay in the commercial operate date (COD).

In the cases of Nam Ngum 2 and Nam Ngum 3, Memoranda of Understanding (MOU) were agreed in September 1997. However, the PPA negotiations have been delayed by the financial crisis and the CODs are likely to be considerably delayed.

Among the new projects under negotiation, Nam Theun 2 has received the top priority for development from the government of Lao PDR. The remaining priorities have not been established by the Lao government. The commissioning dates are still under negotiation for all projects with no PPAs and it is likely that two COD's will be set, one in 2006 for some projects with the other in 2008 for the remainder. Should power be sold prior to 2006, only the non firm price will be paid i.e. only the energy payment and not the availability payment.

2.3.2 Union of Myanmar

An MOU between Thailand and the Union of Myanmar was signed for the purchase of 1,500 MW of power by the year 2010. Further negotiations are awaiting the results of the feasibility studies for the various potential projects which are currently being undertaken.

2.3.3 People's Republic of China

On 12 November 1998 a Memorandum of Understanding between the Royal Thai Government and the Government of the People's Republic of China was signed for the purchase of 3000 MW of power by the year 2017. The MOU was signed by Dr. Savit Bhotiwihok, Minister to the Office of the Prime Minister, Thailand and the President of the State Power Corporation of China. Additionally, discussions have been undertaken on the possibilities for purchasing 1,200 MW from the Jinghong Project by around 2010. A feasibility study is currently under way.

2.4 Sale of Power to Myanmar

A joint Thai/Myanmar committee has been established to develop and manage a plan to sell 100 – 150 MW of power to Myanmar to assist in alleviating their current power shortage. This plan calls for the construction of a transmission line between Mae Sot in Tak Province, Thailand and Bago in Myanmar to link the Thai and Myanmar grids. A feasibility study is currently underway and it is expected that the sale can commence in 2001 or 2002, once the transmission line is completed.

The same transmission line could be used to supply power from Myanmar to Thailand when Myanmar is able to complete the development of sufficient generating capacity.

3. Objectives and Overall Privatisation Policy

The main objectives of the promotion of the private sector role are to:

1. **INCREASE** competition in the energy industry to bring about more efficiency within the industry and the provision of adequate energy at reasonable prices for consumers;

2. **REDUCE** the investment burden of the government as well as the public sector debt;

3. **PROMOTE** the more efficient use of energy such as that demonstrated by SPP projects using the cogeneration system;

4. **ENSURE** power users are provided with the best possible services, price levels and safety standards;

5. **ENCOURAGE** the general public's participation in the energy industry development of the country through the development of the capital market;

6. **DEVELOP** the capital market.

It is important to note that under the current economic condition, one of the most important aim of privatisation is the reduction of the nation's debt. However, since the electricity supply industry (ESI) and the natural gas supply industry (GSI) in Thailand, are still natural monopolies, the increase in the role of the private sector and privatisation must be implemented in parallel with the deregulation programs in order to promote competition and avoid the transfer of public monopolies to private sector monopolies.

A number of state enterprises could be privatized without any change in law. In these cases the privatisation could be implemented immediately. In certain cases the state enterprises need to be corporatised first by amending legislation. In these cases the government has pushed through the State Enterprise Corporatisation bill which is expected to become law in April/May 1999 in order to facilitate the privatisation process.

4. Current Policy on Privatisation of the Energy Sector

Privatisation of government owned enterprises and increasing private participation should be implemented whether the country is facing any financial problem or not as it will increase competition and efficiency in energy-related industries. The current financial condition is providing an even stronger rationale for increasing private sector participation, as it will help to reduce the debt burden of the country and also attracts investment. The government has therefore decided to speed up the privatisation of energy-related industries.

Taking into consideration the current status of the industry, the government's role can be immediately reduced for certain enterprises, especially those already listed on the Stock Exchange of Thailand (SET). For some enterprises, it will take approximately 1-2 years to make the necessary preparation and deal with any employee problem.

Privatisation of the energy sector has been gradually implemented over a number of years. The current policy derives from a number of resolutions by the National Energy Policy Council (NEPC) and the Cabinet. The latest resolutions are those of the Cabinet on 16 September 1997 that speeded up privatisation of the energy sector, the Cabinet resolution on 4 November 1997 which approved the sale of shares in EGCO and PTTEP, the Cabinet resolution on 1 September 1998 which approved the Master Plan for State Enterprise Sector Reform and the Cabinet resolution on 16 February 1999 which approved the privatisation of the Ratchaburi power plant and the natural gas deregulation program.

The third letter of intent between the Thai government and the IMF also clearly outlines specific measures related to the privatisation of the energy sector as follows:

- In the Energy sector, we will accelerate privatisation and competition. As part of our broader strategy of encouraging the entry of independent private generators to enhance competition, EGAT has initiated sales of its stakes in Electricity Generating (Public) Co. Limited and Powergen 2 (Ratchaburi power plant) during 1998. Over the longer term, we intend to split EGAT into separate generation and transmission companies, which themselves will eventually be privatized.

- In the Oil sector, we will relinquish our stake in Bangchak Petroleum Company, commencing the process in June 1998. Also, we will sell a part of PTT Exploration and Production (PTTEP), with the aim of privatizing PTT itself by the end of 1999.

4.1 Immediate Sale of the Government's Shareholding

The following are enterprises in which the government can immediately reduce its shareholding by selling its shares to the private sector and/or making a public offering through the stock market and/or seeking strategic investors to buy its shares. During the past two years, considerable progress has been made in the dilution of government's share holding in these state enterprises.

4.1.1 Bangchak Petroleum Co., Ltd.

The current registered capital is 5,220 million baht (522 million shares; Par Price: 10 baht/share). The Ministry of Finance and PTT hold 48% and 24% of the shares respectively. The public offering through the SET will further lower the share price; therefore, the Cabinet on 16 September 1997 approved in principle that strategic investors should be identified to buy the Ministry's and PTT's shares. Should the selling price come in at 15 baht/share, the Ministry and PTT will obtain 5,600 million baht from the sale;

The Ministry of Finance (MoF) and PTT have engaged JF Thanakom and TISCO as financial advisors to draw up strategies for the sale of shares. However, effort to sell shares belonging to MoF and PTT has been delayed due to opposition by the management. The government's intention has also been seriously distorted to make the general public believe that the government intends to sell the Bangchak refinery to greedy foreigners which would end all social activities which the Company is undertaking. The management was, however, not opposed to sale of shares to the general public through public offering, but given the current economic condition, the sale price would be very low.

Finally it was resolved by the State Enterprise Policy Committee in February 1999 to proceed as follows:

- PTT and Krung Thai Bank would sell all their shares in Bangchak equivalent to 32% of all shares outstanding.

- 16% of the shares would be sold to a strategic investor through the selective bidding process.

- The other 16% of the shares would be sold to the general public at the price obtained through the selection of the strategic investor.

It is not clear how this policy would be implemented as it would be difficult to find any strategic partner who would be willing to pay a premium price under these terms and conditions.

4.1.2 Esso (Thailand) Co., Ltd.

Since 1994, the Ministry of Finance has held 12.5% of shares, purchased from Exxon for 3,700 million baht. This resulted from the policy of the government at the time that it should be a shareholder of each refinery to ensure security of oil supply. In granting licence for Esso (Thailand) to expand its refining capacity from 65,000 barrels/day to 145,000 barrels/day, it was agreed that the Ministry of Finance would hold 12.5% of shares of the company and that Esso would list 20% of shares on the SET by the year 2000. This will dilute the Ministry of Finance’s shareholding to 10%.

With the current competitive environment in the oil market, the government believes that the government’s shareholding in Esso is no longer essential; in particular, the 12.5% shareholding does not render enough power to determine the policy or management direction of the company any way. In addition, it would take three years before the shares can be sold in the SET, if so wishes. Consequently, the Cabinet on 16 September 1997 approved NEPC resolution of 10 September 1997 for the Ministry of Finance to negotiate with Esso to sell back all its shares. NEPO has undertaken a study to determine the best strategy for the sale and has submitted the proposal to MoF, who has recently selected JF Thanakom and Dresdner Kleinwort Benson as the financial advisors to assist in the management of the process. Negotiation in currently taking place with Esso to finalise the terms and conditions of the sale.

4.1.3 PTTEP

Prior to mid 1998, PTTEP had a registered capital of 3,100 million baht (310 million shares; Par Price: 10 baht/share). PTT held 70.98% of shares; the remaining 29.02% was held by the general public in the SET.

Cabinet on 16 September of 1997 and 4 November 1997 approved the sale of PTT’s shares in PTTEP in order to reduce PTT’s shareholding down to 51%. The roadshow for an offering of 37.375 million shares in PTTEP began in May 1998, with the offering process completed at the end of June 1998. In this tranche of shares, PTT old shares accounted for 16.5 million; PTT new shares accounted for 16 million; and the Greenshoe Option accounted for 4.875 million shares offered. The share price, obtained through the book building process, was 300 baht which was very reasonable under the extremely difficult market condition at the time. The offering raised US$268 million or 11 billion baht.

International investors had bought 92% of the offering, with the public ownership of PTT rising to 39.3%, whereas PTT's share holding declined to 60.7%. The transaction's joint global co-ordinators consisted of Goldman Sachs, CS First Boston, Lehman Brothers, Phatra and TISCO.

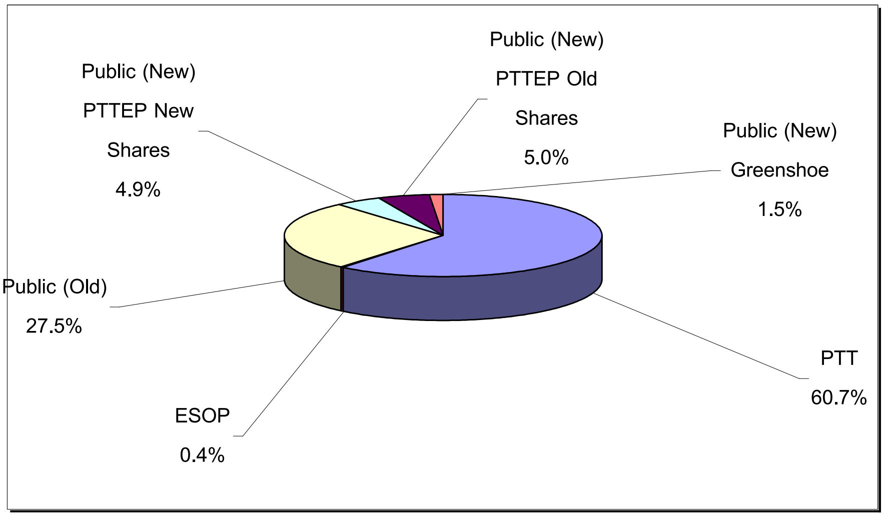


Figure 5: PTTEP Post Offering Ownership

4.1.4 Electricity Generating Public Co., Ltd.

EGCO could not participate in the previous round of IPP bidding since its participation would lead to an unfair competition. As long as EGAT retained its share in EGCO at such a high level (40%), it would have been inappropriate for EGCO to participate in future IPP biddings. This meant that EGAT's shareholding in EGCO had become a major obstacle to business expansion of EGCO.

To enable EGCO's business to expand both domestically and internationally, EGAT decided to dilute its shareholding in EGCO to a more acceptable level. The most appropriate strategy was for EGCO to select strategic partners to take over the shareholding.

It was believed that strategic partners who would be beneficial to EGCO would include:

- Companies involved in the IPP business, who can help EGCO expand abroad its power generation business;

- Companies involved in oil and natural gas exploration and development since this will help supply EGCO with fuel resources for power generation. If competition in the gas supply industry is promoted according to the government policy, having its own natural gas deposit(s) will greatly benefit EGCO in future IPP rounds.

In 1997, EGCO had a registered capital of 5,300 million baht (530 million shares; Par Price: 10 baht/share; amount already paid: 5,212.3 million baht). EGAT's shares in EGCO was 211.77 million shares (40.7%).

The Cabinet on 16 September 1997, therefore, approved the sale of EGAT's shares in EGCO to a strategic investor and the Cabinet on 4 November 1997 gave consent to the strategy to sell EGAT's shares in EGCO as follows:

- To sell 14.9% of shares to a strategic investor with EGAT retaining 25.8% stake in EGCO after the sale, with an option to reduce EGAT's stake to 20% at a later date;

- To appoint a committee for the selection of strategic investor consisting of representation from EGAT, EGCO, NEPO and MoF
- The EGAT Board to consider and grant final approval on the selection of strategic investors and to report to the NEPC and the Cabinet for acknowledgement.

The objectives of the sale were to

- Enhance competitiveness of electricity supply industry in Thailand
- Enhance long term development of EGCO
- Maximise sales proceeds to EGAT
- Maximise value of EGAT's remaining stake in EGCO

The process for sale of shares in EGCO consisted of the following steps

- First stage prequalification (completed mid February 1998) to draw up a short list of 10-12 bidders. Criteria for shortlisting bidders were

    - Net worth
    - Financial Resources
    - Experience
    - Strategic fit
    - Participation in the bidding process
    - Business strategy

- There were 14 companies that submitted prequalification statements on February 6, 1997

  - China Light and Power (HK)
  - Edison Mission Energy (USA)
  - Electricite de France (France)
  - El Paso Energy (USA)
  - EPON (Netherlands)
  - GMS (Thai)
  - Mitsubishi (Japan)
  - PowerGen (UK)
  - Singapore Power (Singapore)
  - Sithe Pacific (USA)
  - Texaco Energy (USA)
  - Total (France)
  - Tractebel (Belgium)
  - YTL (Malaysia)

- Second stage pre-qualification involved the selection of 12 shortlisted bidders to make presentations (mid March 98) from which 6 final shortlisted bidders were selected (April 98). These were:

  - China Light and Power
  - Edison Mission Energy
  - Electricite de France
  - El Paso Energy
  - Singapore Power
  - YTL

- Due diligence process by final short listed bidders

- Visits to head offices (May 98)

- Final Bid submission (26 June 98)

China Light and Power's (CLP) bid of US$239.96 million (Bt9,838 million – amounting to Bt126 per share) was accepted by the selection committee on 30 June 1998, with financial close achieved in July 1998.

The Strategic Investors were required to enter into the following agreements:

- Share Purchase Agreement
- Share Holders Agreement
- Joint Venture Agreement

The key elements of the agreements were that EGCO was to remain a Thai company, with the Managing Director a Thai national. Further, the strategic investor was limited to a maximum 25% holding.

4.2 The Electricity Supply Industry (ESI)

4.2.1 ESI Reform

The policy on the restructuring and privatization of the electricity supply industry (ESI) of the country to promote competition and private sector participation has been ongoing. A cabinet resolution of 5 March 1996 gave consent to the separation of generating, transmission, and distribution businesses. Under this resolution, EGAT's thermal power plants would be separated into business units (BUs) and then corporatised, registered and listed on the Stock Exchange of Thailand (SET), as necessary to raise funds.

The cabinet resolution of 1 September 1998 gave consent to the Master Plan for State Enterprise Sector Reform (the Master Plan), which will serve as a framework in determining the scope and direction of restructuring and privatization of four main economic sectors, including the energy sector.

The Master Plan for State Enterprise Sector Reform envisages that the future structure of the ESI will follow the competitive model being implemented in many countries around the world. This competitive model provides for competitive generation companies (GENCOs), which both compete into a power pool as well as having individual bilateral contracts with major customers.

An independent system operator (ISO) functions as an independent referee over the competitive generation process. It is important that the ISO own no generation asset as potential and perceived conflicts of interest are avoided. The transmission company is owned and maintained by a separate company from the ISO. The transmission company is regulated by the national regulator because it is a natural monopoly, and regulation will ensure open access as well as a reasonable tariff.

The distribution companies (DISCOs) could have geographical responsibility for distributing power within regions of Thailand. Since, under this model, distribution acts as a natural monopoly, the regulation of access and tariff levels will be set by the national regulator. The retail supply function can be achieved by DISCOs or by independent supply companies.

The implementation of this future ESI represents a complex, technical and political challenge. To date, it has been implemented primarily in developed economies. Accordingly, for planning purposes, an implementation process in three stages is planned and will require five or more years to accomplish.

4.2.2 Stage I: EGAT as primary power purchaser/provider (1998-2001)

Using the State Enterprise Corporatisation Act, EGAT would be corporatised as a whole, with autonomous business units operating as profit centers with Ratchaburi power plant privatised. Regulatory controls would be established to ensure non-discriminatory treatment of all generators by transmission. In this stage, EGAT would retain its pre-eminent position in bulk purchase and supply of power, with MEA and PEA retaining their franchise customer base (other than that which is served by SPPs)

The key attributes and issues associated with Stage I are:

- Limited private sector participation in generation providing for a portion of the capital needs of EGAT.
- Long-term central power planning under EGAT's responsibility.
- Limited accountability or incentives to gain productivity efficiencies, due to a lack of competition between the generators.
- Commercial risk shared by the private sector and the government-owned entities.
- No customer access to competitive power, except through SPPs.
- Approval for an independent regulatory regime for electricity

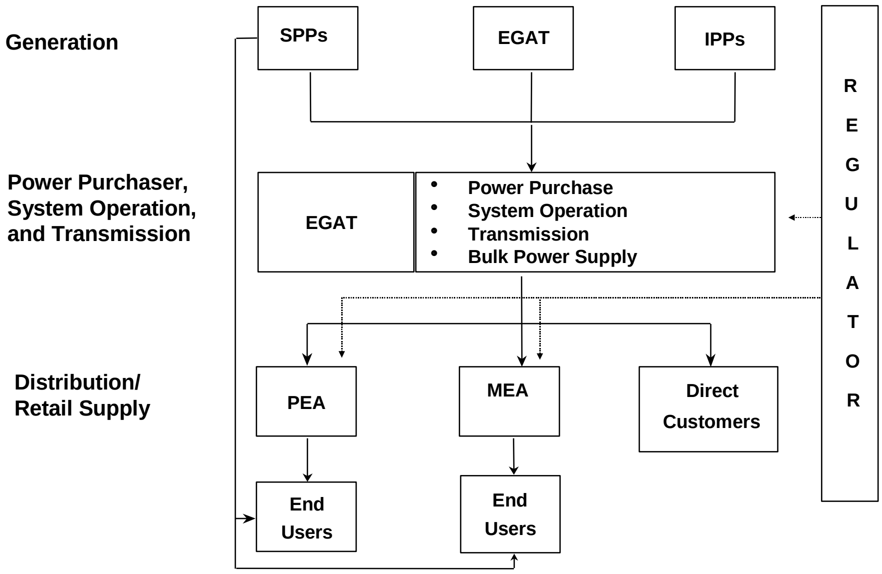


Figure 6: Stage I Structure of the ESI

4.2.3 Stage II: EGAT as central supplier of power, with gradual introduction of wheeling (From year 2001 to 2003)

EGAT would retain its position as central supplier of power. EGAT would be a holding company, with a transmission operator (EGAT-T) as a subsidiary and other functions initially as profit centers that are subsequently corporatised. However third party access is gradually introduced to allow power producers to sell directly to users, using the wheeling services of EGAT-T, and MEA's or PEA's distribution lines.

The key attributes and issues associated with Stage II are as follows:

- EGAT would face competition in bulk purchase and supply of power.
- Enhanced private sector participation in both generation and retail supply by permitting generators to sell directly to large customers.
- Generators will be required to compete for sales to large customers, thus enhancing the efficiency drivers on the generation sector.
- A regulatory framework will be required for transmission and distribution pricing. This would include the establishing an independent regulator and implementing an incentive regulation scheme.
- An alternative mechanism for funding subsidies implemented enabling MEA and PEA to be placed on level playing field with new competitors. The most likely mechanism would be a levy on generation, which would produce a pool of funds to be used to provide the target subsidies.
- Continued role for EGAT as the central agency for long-term planning and system operation.
- All business units to be corporatised
- Increased private investment in Powergens

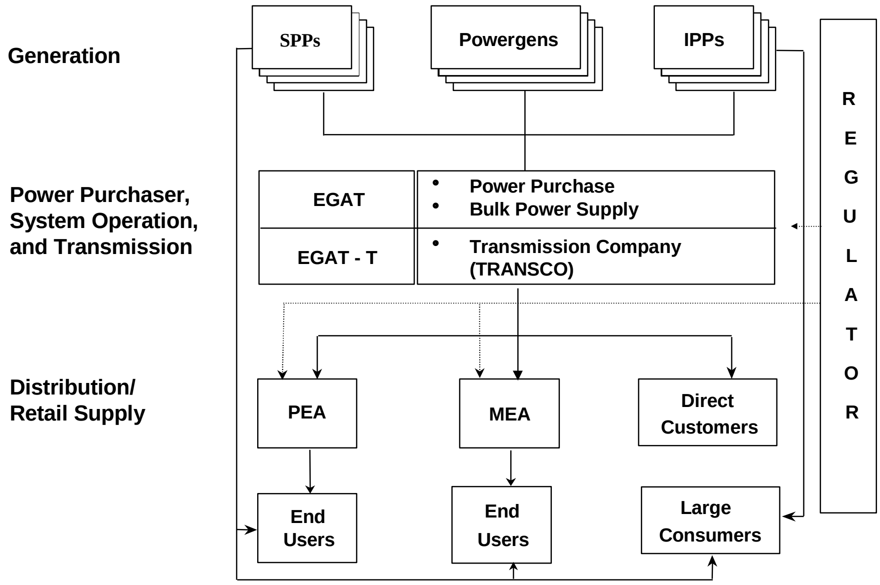


Figure 7: Stage II Structure of the ESI

4.2.4 Stage III : Competitive wholesale power pool / introduction of retail competition (From year 2003 onward)

In the long term, it is envisaged that a competitive wholesale power pool will be developed with power trading taking place within this pool. Retail competition would be introduced initially for certain customers and gradually expanded to cover a wider group of consumers. Generation companies (GENCOs) would bid into the wholesale "pool" and be dispatched in accordance with the lowest bid offered which satisfies demand for that period (perhaps on a half-hourly basis).

To implement government energy policy such as fuel diversity and maintain adequate competition among GENCOs may require regulation of generation. This may require a fuel preference in fuel licensing or fuel allocation for pool purchase.

An Independent System Operator (ISO) would be responsible for economic merit order dispatch, as well as system security and financial settlements for bulk power purchases. The ISO would be formed as a government corporation funded by user charges on power purchases and sales.

Retailers (which may or may not be a combined distribution and retail enterprise) would have non-discriminatory access to the transmission and distribution network, with a regulated Transmission and Distribution access tariff paid to the relevant network service providers.

As transitional matter, Distribution Companies (DISCOs) would retain a customer franchise base. Only large customers will be given access to the competitive market at first. Franchises will be gradually unwound as the market matures, and certain commercial and regulatory issues are resolved such as the vesting of PPAs and treatment of subsidies.

EGAT in this stage would remain a holding company with TRANSCO (EGAT-T) as its subsidiary, hydro generation plus minority interest in some GENCOs and additional certain supporting functions.

Accomplishing the long-term ESI will require extensive restructuring of existing utilities in Thailand as follows:

- Generation owned by EGAT would be spun off into separate groups of GENCOs (with the possible exception of hydro).
- An independent system operator would be established.
- PEA may consider to split into corporatised distribution companies (DISCOs). The future study to determine the optimal structure is required. The key factors needed to be considered are the energy consumption in each area, the impact to new distribution entity's performance and its customer.
- A separate supply function would be established and corporatised, either owned or independent from the DISCOs.

The key attributes and issues associated with the competitive electricity structure are as follows:

- Private sector participation in both generation and retail supply.
- Competitive neutrality between state-owned and private sector generation companies, fostering real competition in bulk and retail supply of power.
- With the correct design of a competitive structure, there would be strong efficiency drivers in power generation and retail supply.
- Market signals replace central planning. Since the large customers will have direct access to generators, new capacity will only be added as economically justified by competitive supply-and-demand relationships.

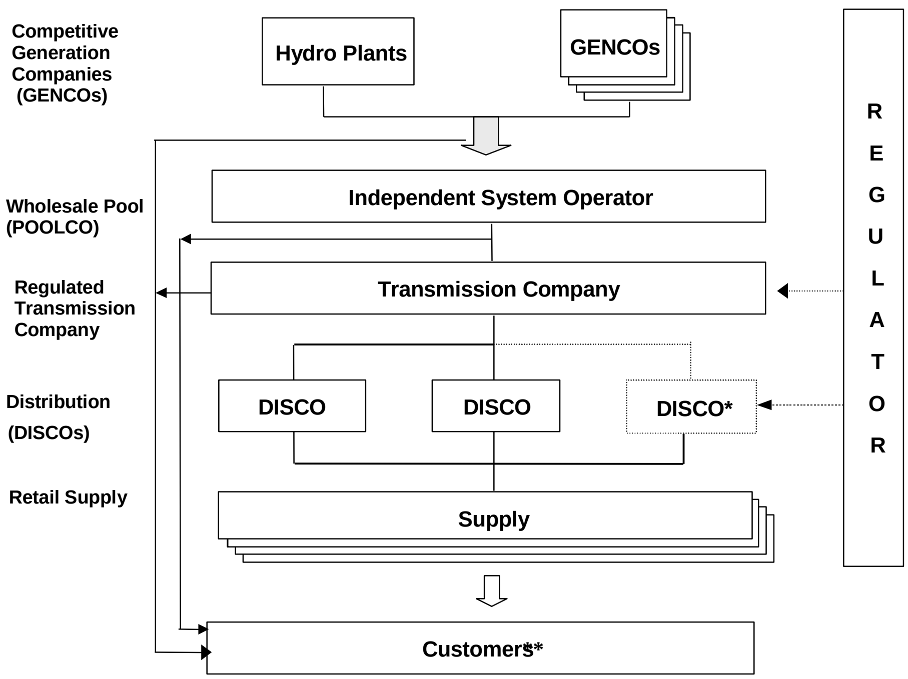


Figure 8: Stage III Structure of the ESI

4.3 The Electricity Generating Authority of Thailand (EGAT)

The Cabinet resolution of 5 March 1996, giving consent to the resolution of the National Energy Policy Council (NEPC), has prescribed the corporatisation and privatisation of EGAT as follows:

1. The separation of EGAT's thermal power plants from EGAT and their corporatisation into limited companies, selling their shares to the general public/private sector;

2. The corporatisation of the maintenance, engineering, and mining business units into limited companies;

3. The transmission line business and power generation using hydropower will still be retained by EGAT, which will remain a state enterprise.

Following the Cabinet resolution, several advisors were engaged by EGAT to undertake studies in order to implement the policy. The preliminary conclusions of the studies are that EGAT's thermal power plants should be separated and corporatised into three companies (powergens). To make the three companies attractive to investors, the allocation of EGAT power plants (those which currently exist/under construction and those to be constructed in the future) would be made to the three powergens.

EGCO (Already Privatized)		**MW**
Existing Power Plants	Rayong	1,223
	Khanom	824
	Total	**2,047**
Ratchaburi Holding		
Existing Power Plants	Ratchaburi CC	2,175
	Ratchaburi TH	1,470
	Total	**3,645**
EGAT		
Existing Power Plants	Bang Pakong	3,675
	Wang Noi	2,031
	North Bangkok	238
	Nam Phong	710
	Mae Moh	2,625
	South Bangkok	2,288
	Sai Noi	244
	Nong Chok	488
	Lan Krabue	134
	Total	**12,433**
Future Power Plants	*Krabi*	*600*
	Suratthani	*300*
	Total	**13,333**

Figure 9: EGAT's Thermal Generation Facilities

The plan to implement the proposed structure hit an obstacle when the EGAT Employee Association (EEA) raised issues with it. The EEA has stated it is not against privatisation or change, just that it has significant concerns about how the changes are to be implemented. The concerns of EGAT Employee Association are two-fold:

- The impact of privatisation on employees - loss of job security and benefits, loss of employment without adequate unemployment benefits;
- The impact of privatisation on the country - tariff increases, adverse effects on adequacy and reliability of electricity supply, neglect of unprofitable customers in rural areas, adverse effects on environment

The plan was, therefore, revised to accommodate the concerns of the EEA. The final objectives and proposed structures of the ESI in the medium and long term, however, remain the same. The proposed approach for privatisation of EGAT under the Master Plan consists of three main stages consistent with the 3 stages for the liberalization of the ESI:

Stage 1 : Corporatise current EGAT as a whole & privatise Ratchaburi Combined Cycle (CC) 1-3 and Ratchaburi Thermal (TH) 1-2 to be completed by 2001.

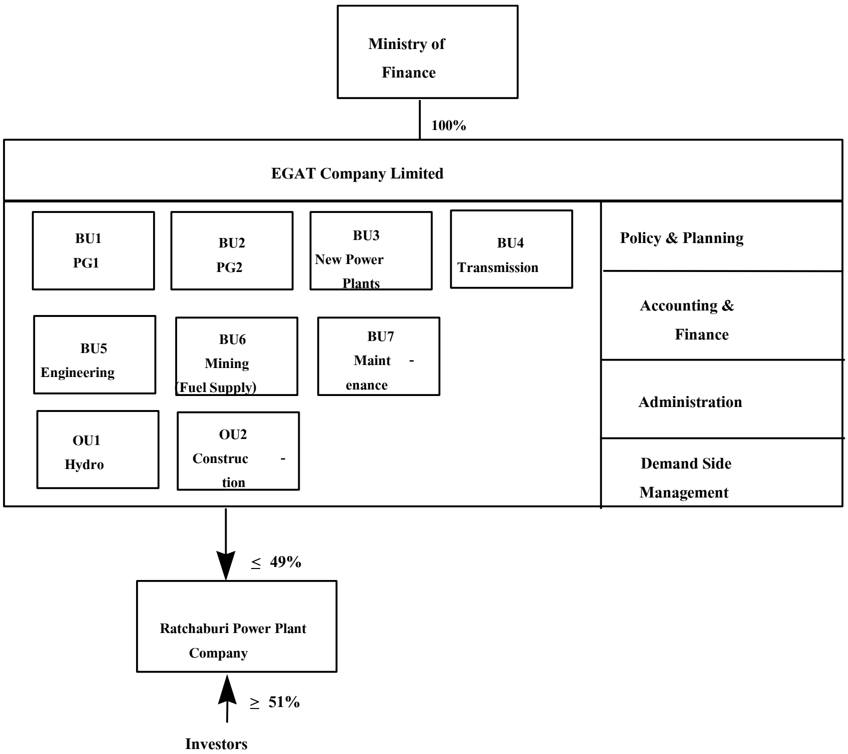
- Organise EGAT into autonomous business units (BU), which operate as profit centers.
- Transform EGAT into a Public Company (Plc), 100% owned by MoF when the State Enterprise Corporatisation Act is ready.
- Establish regulatory controls to ensure non-discriminatory treatment of all generators by transmission.
- Corporatise Ratchaburi CC1-3 and Ratchaburi TH 1-2 as an EGAT subsidiary and privatize to reduce EGAT's shareholding to less than 50%.

Stage 2 : Corporatise business units and and privatise power generation subsidiaries (2001-2003)

- All business units to be corporatised.
- Power generation subsidiaries will be gradually privatized.
- Non power companies to be established could include:
    - A maintenance company to carry out maintenance work;
    - An engineering and construction management company to be responsible for engineering work and construction management;
    - A fuel supply holding company.

Stage 3: Privatisation of Transmission Company (From year 2003 onwards)

- Further privatisation of generation facilities and other subsidiaries.
- Privatise transmission company.
- Establish more comprehensive regulatory framework for power sector.



Note: PG1: Bang Pakong, North Bangkok, Wang Noi, Nam Phong
PG2: Mae Moh, South Bangkok, Nong Chok, Sai Noi, Lan Krabue

Figure 10: Proposed EGAT Privatisation Approach Stage 1

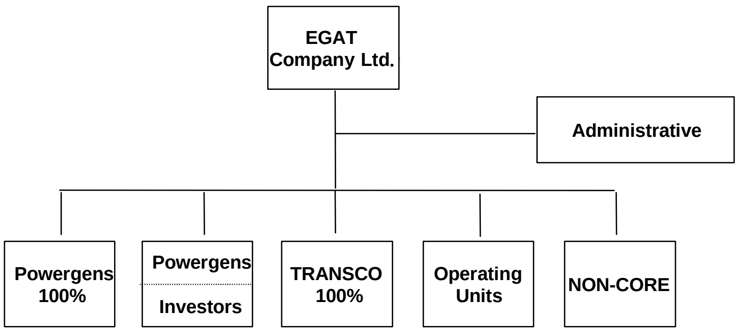


Figure 11: Proposed EGAT Privatisation Approach Stage 2

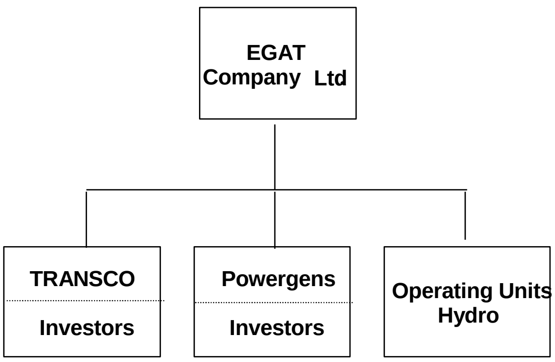


Figure 12: Proposed EGAT Privatisation Approach Stage 3

The new plan incorporates and endeavours to balance the requirements of the different stakeholders, being the government, EEA, EGAT management and the general public. These requirements include:

- An urgent need to raise funds through private participation to finance the expected cash flow shortfall of EGAT over the next few years. The reduction of EGAT's shares in Ratchaburi to 33% is expected to raise around Bt60 Billion.
- The introduction of effective competition into the power sector over time to promote efficiency.
- The establishment of adequate safeguards to protect the interests of consumers, the general public and the nation as a whole
- Consideration of the welfare of EGAT employees in any restructuring for privatisation

The National Energy Policy Office (NEPO) has engaged an advisor to determine the appropriate regulatory framework corresponding to the future structure of the electricity supply industry. Since Thailand does not have a comprehensive electricity law, the MoF would wholly own EGAT Plc (100%). There would be no divestiture of the transmission or distribution companies until a comprehensive regulatory framework has been established in conjunction with the establishment of an independent regulatory authority.

A new study will also begin in May/June 1999 to draw up a comprehensive plan to introduce competition, a clear structure for the market and the power pool. The study will also examine the mix of power plants within each proposed power generation subsidiaries of EGAT in the context of establishing a power pool as well as transitional issues like the existing PPAs and stranded costs.

4.4 Ratchaburi Privatisation

4.4.1 Background

In 1998, EGAT engaged a group of financial advisors, comprising Dresdner Kleinwort Benson Advisory Services (Thailand) Limited, Lehman Brothers (Thailand) Limited, and SCB Securities Company Limited, to carry out a study and draw up a plan for the privatisation of the Ratchaburi Power Plant. This Plan was approved by the EGAT Board on 18 November 1998 and by the NEPC on 10 February 1999 and the Cabinet on 10 February 1999.

Ratchaburi Power Plant Project, currently under construction, is composed of generation facilities and other assets for common use, e.g. office buildings, water resources and cooling tower systems.

Combined Cycle Plants	Blocks 1-3	Completion Schedule	Generating Capacity (MW)
Gas Turbine	Block 1 Unit 1	Apr 1999	230
	Unit 2	May 1999	230
	Block 2 Unit 1	Jun 1999	230
	Unit 2	Jul 1999	230
	Block 3 Unit 1	Aug 1999	230
	Unit 2	Sep 1999	230
Steam Turbine	Block 1 Unit 1	Apr 2000	265
	Block 2 Unit 1	Jun 2000	265
	Block 3 Unit 1	Mar 2001	265
		Sub Total	2,175
Thermal Plant	Units 1 and 2		
	Unit 1	Jan 2000	735
	Unit 2	May 2000	735
		Sub Total	1,470

Figure 13: Ratchaburi Power Plant Project

4.4.2 Privatisation Approach

The privatization approach for Ratchaburi Power Plants is to establish Ratchaburi Holding Company and two subsidiaries, i.e. Ratchaburi Combined Cycle PowerGen Company Limited (Subsidiary 1) and Ratchaburi Thermal PowerGen Company Limited (Subsidiary 2).

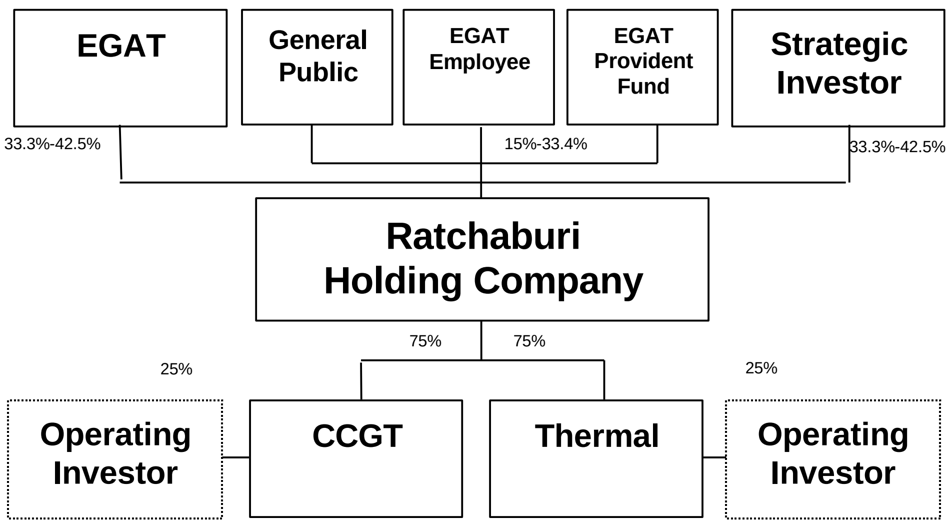


Figure 14: Ratchaburi Structure

Implementation Steps

<u>Step 1</u> Ratchaburi Holding Company is to be established, 100% owned by EGAT.

Step 2 Ratchaburi Holding Company and EGAT jointly establish two subsidiaries, namely Ratchaburi Combined Cycle PowerGen Company Limited (Subsidiary 1) and Ratchaburi Thermal PowerGen Company Limited (Subsidiary 2), with Ratchaburi Holding Company and EGAT holding 75% and 25% of shares respectively.

Step 3 EGAT sells 51% of its shares in Ratchaburi Holding Company: 49% to Strategic Investor 1 through a selective bidding process at the bidding value and 2% to EGAT employees at the par value. Then the company will raise equity, initially, by offering rights issue to existing shareholders, i.e. EGAT, Strategic Investor 1, and EGAT employees. EGAT still holds 49% of the company's shares.

Step 4 Subsidiary 1 raises equity and offers rights issue to Ratchaburi Holding Company and EGAT according to their shareholding (75:25). EGAT will subsequently sell its 25% shareholding in Subsidiary 1 to Strategic Investor 2 through a selective bidding process at the bidding value.

Step 5 Subsidiary 1 secures a loan to buy the Combined Cycle Power Plants and land from EGAT. When the payment is made to EGAT, the rights on the plants and land will be transferred to the company. At the same time, Ratchaburi Holding Company, when a payment is made to EGAT, will receive the rights on common assets and the land remaining from the sale to Subsidiaries 1 and 2. The rights transfer is scheduled around September 1999. Since the construction of the steam turbine units of the plants will not be completed at the time of rights transfer, EGAT will have to keep the revenue from the sale of the plants -- in particular the portion for the steam turbine units -- in escrow until the construction of those units is completed.

Step 6 Transform Ratchaburi Holding Company into a public limited company (PLC) and raise equity, for the second time, by offering rights issue to the general public, EGAT employees, and EGAT Provident Fund. The remaining equities (if any) will be offered to EGAT and Strategic Investor 1 to be prepared to purchase rights issue of Subsidiary 2, the proceeds of which will be used in the purchase of Ratchaburi Thermal Power Plant from EGAT. At this step, the shareholding structure of Ratchaburi Holding Company is expected to be as follows:

• EGAT	33.3 – 42.5%
• Strategic Investor 1	33.3 – 42.5%
• General Public, EGAT Employee, EGAT Provident Fund	15 – 33.4%

Step 7 Subsidiary 2 raises equity and makes an offer to Ratchaburi Holding Company and EGAT according to their shareholding (75:25). EGAT will subsequently sell its 25% shareholding in Subsidiary 2 to Strategic Investor 3 at the bidding value.

Step 8 Subsidiary 2 secures a loan to buy the Thermal Power Plant and land from EGAT. When the payment is made to EGAT, the rights on the plant and land will be transferred to the company. The rights transfer is scheduled around May 2000.

4.5 PEA and MEA

The Cabinet resolution of 28 November 1996, giving consent to the NEPC resolution, stipulated that PEA should remain a state enterprise and that four subsidiary companies should be established to be responsible for power distribution in each region.

The Cabinet resolution of 17 June 1997, giving consent to the NEPC resolution, stipulated that MEA should remain a state enterprise and that certain businesses should be separated and become MEA's subsidiary companies, i.e.

- A power system services company;
- A concrete product designing and manufacturing company;
- An energy services company (ESCO).

Since the power distribution system is a natural monopoly, privatisation will, therefore, require amendments of the MEA Act and PEA Act. In addition, new legislation to implement a regulatory framework will be required. This process is likely to be lengthy.

To move the liberalisation of the distribution sector forward, the Cabinet on 16 September 1997 and 4 November 1997 therefore approved NEPO's proposal that the concrete business which manufactures concrete poles would be an appropriate starting point for privatisation within the next two years. This would be undertaken by privatizing the MEA's Office of Concrete Product Designing and Manufacturing and transforming it into the Concrete Product Designing and Manufacturing Company Limited. The company would be registered with MEA holding a 100% shareholding. This will be later diluted to no more than 49% so as to divest the company of the state enterprise status as soon as possible. Strategic investors will be identified.

The cabinet resolution of 1 September of the State Enterprise Reform Master Plan included an action plan for the restructuring of MEA and PEA and their privatisation. Futher study is to be undertaken on the methods of restructuring. In particular, the potential for the separation of distribution and supply will be examined to allow the development of competition in retail supply. Should such a strategy prove feasible and viable, the issue of the geographic separation of the distribution utilities may be re-considered.

Enterprise Action Plan/MEA and PEA

1. End 2000, establish non-core activities as business units
2. End 2001, corporatise as wholly owned subsidiaries the non-core activities.
3. End 2001, distribution and supply established as separate cost centres within MEA.
4. End 2001, distribution and supply established as separate cost centres within PEA.
5. End of 2001, PEA reorganised into regional distribution units, established as cost centres, in preparation for profit Center operation.
6. 2002 – MEA core electric distribution business corporatised.
7. First Half of 2004 – PEA regional distribution units corporatised

Enterprise Privatisation Plan/MEA and PEA

2002 – 2004	MEA non-core subsidiaries privatised.
2003 – 2004	MEA privatised.
2002 – 2004	PEA non-core subsidiaries privatised.
2nd half 2004	PEA DISCOs privatised.

4.6 Gas Supply Industry

4.6.1 Background

The gas industry in Thailand is virtually dominated by two players, the Petroleum Authority of Thailand (PTT) and the Electricity Generating Authority of Thailand (EGAT).

PTT, with only a few minor exceptions, acts as the sole purchaser, transporter and distributor of natural gas in Thailand. PTT purchases all indigenous gas from the producers including PTT Exploration and Production (PTTEP) and transmit this through its pipeline system to end-users.

Private participation in pipeline construction has been introduced with the establishment of PTTNGD, a joint venture pipeline owned 49% by PTT and the balance by private companies.

PTT's activities consist of gas exploration and development, gas pipelines, and gas trading. In the petroleum sector, they consist of refining and retail distribution, international trading activities, and a number of international downstream joint venture operations.

Its network of pipelines currently stretches 1,512 km, linking all commercial offshore gas fields to EGAT's power plants, its four gas separation plants (GSPs) and industrial users. All PTT's contracts, whether with suppliers or consumers, are on a long-term (20-30 year) minimum take-or-pay basis.

EGAT is by the far largest consumer of natural gas in Thailand. In 1997, 75% of natural gas consumption went for power generation, 14% for the production of LPG and petrochemical feedstock from the GSPs and 11% was consumed as industrial fuel. There is no retail gas industry as yet.

4.6.2 Current GSI Structure

Production

In the production process, there is competition among several producers. However, only three are dominant players, namely: UNOCAL, PTTEP and Total. Additionally, there are joint partnerships among the dominant players in certain projects.

Gas transmission

- Gas transmission is solely operated by the public organization, PTT;
- The pipeline tariff rate is regulated by NEPO/NEPC;
- Future demand for gas transmission system remains continual.

Gas supply and distribution

- Gas supply and distribution is operated by PTT;
- The rate of return from the gas supply and distribution is regulated by NEPO/NEPC.

Gas transportation in the distribution system

- The distribution pipeline system is still limited;
- There is a joint venture between PTT, Tractebel and British Gas to provide distribution system services under the Bangkok Ring project.

Gas consumers

- There are numerous gas consumers, but the major one is the Electricity Generating Authority of Thailand (EGAT) due to the limitation of the pipeline system (80% of natural gas is used in power generation);
- Other types of fuel are being used to replace natural gas.

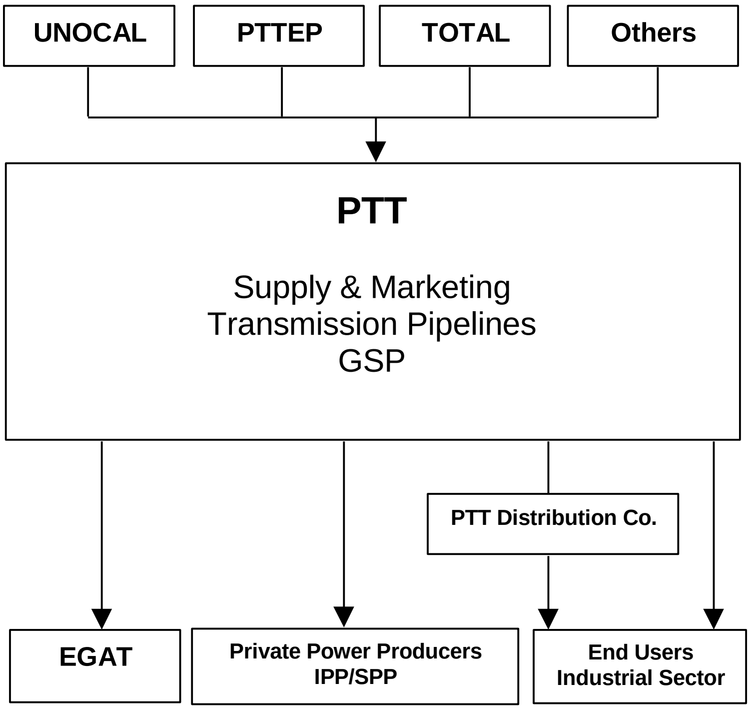


Figure 15: Current GSI Structure

4.6.3 Proposed Future Structure of the Gas Supply Industry

On 16 February 1999 the Cabinet approved the resolution of NEPC of 10 February 1999 on the deregulation of the natural gas supply industry which provides the framework for the reform of GSI. According to the GSI reform plan, transmission and distribution pipelines and gas trading shall be separated, by establishing a separate company to operate the transmission pipeline business. Competition in the GSI will be promoted by introducing TPA on the transmission pipeline services. This is to be regulated by an Independent Regulatory Agency to ensure fair pricing and non-discriminatory treatment in the use of pipeline services. As a result, the main aspects of the long-term GSI structure can be summarized as follows:

Production

- In the production process, there is competition among various producers.

Gas transmission

- Separate the transmission pipeline system to provide greater transparency, fairness and accountability;
- The Independent Regulatory Agency is to regulate the pipeline tariff rate and the development of the gas transmission system master plan;
- For the existing pipeline system of PTT being operated at full capacity, PTT can continue the operation with no need to apply the TPA rule, except when excess capacity is available;
- TPA is allowed on new pipelines;
- Load balancing will be made;
- There will be bidding for pipeline concession, or joint ventures between the public and the private sectors for the construction and operation of new transmission pipelines, with PTT being eligible to participate in the bidding;
- PTT will be the single network operator of all pipeline networks connecting to the PTT's main pipeline system to ensure stability of the supply and gas quality as well as service efficiency.

Gas supply and distribution

- Regulate the rate of return from the supply and distribution of gas for contracts signed prior to the restructuring of the industry;
- The rate of return from the supply and distribution of gas for new contracts will be determind by market forces.

Gas distribution pipeline system

- PTT Distribution Co., which is a joint venture between PTT, Tractebel and British Gas to provide distribution system services under the Bangkok Ring project, will continue its operation;
- Concession bidding will be opened for the construction and operation of new distribution pipelines.

Gas consumers

- Increase the number of end users in the future;
- Promote the use of other types of fuel which can substitute for natural gas to enhance competition among different fuel types;
- Promote competition among different fuel types.

The following actions need to be implemented to achieve the proposed long-term GSI structure:

- Separation of transmission and supply & marketing businesses;
- TPA on the transmission pipeline infrastructure;
- Definition of existing gas supply and new gas supply;
- Definition of existing gas demand and new gas demand;
- Determination of the extent of private sector participation in the gas pipeline system;
- Regulation of the GSI.

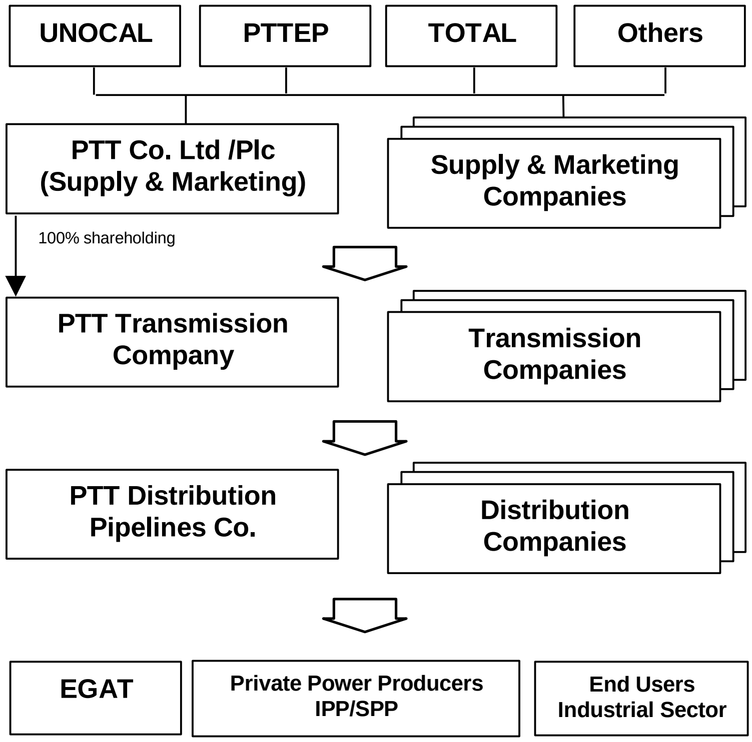


Figure 16: Proposed Future GSI Structure

4.6.4 Separation of Transmission and Supply & Marketing Businesses

Key Considerations

Transmission and supply & marketing businesses will have to be separated to ensure transparency between the activities with no cross subsidization. There are three methods by which the separation of transmission and supply & marketing businesses can be achieved, i.e. accounting separation, legal separation and ownership separation. Ownership separation is the optimum method of achieving transparency, as it would remove the need for government's regulation and extensive supervision to prevent abusive operation, which may hinder competition. Instead, businesses with ownership separation will depend on market forces. However, legal separation will be the method which has less impact on PTT and which is easier to be implemented. In addition, legal separation can be as effective in developing a competitive and transparent market.

Cabinet Resolution

Purely from the point of view of the objective to increase competition in the GSI, ownership separation would be the preferable route. However, considering the impact on PTT the government decided that the restructuring of PTT Gas will be best achieved by separating the transmission business from the supply & marketing business in the form of legal separation. PTT Transmission Co., Ltd. will have to be established, as a subsidiary wholly owned by PTT or PTT Co., Ltd. (Plc). PTT Transmission Co., Ltd. will operate the transmission system of PTT as well as other investors' pipelines to be connected to the PTT pipeline network to ensure stability of supply and gas quality. All commercial transactions between PTT/PTT Co., Ltd. (Plc) should be undertaken on an arm's length contract of international standards to ensure transparency and fairness for other users of transmission infrastructure. NEPC/NEPO will follow up and supervise the operation, and will approve in principle the contracts to be made under the proposed long-term structure.

4.6.5 Third Party Access (TPA) on the Transmission Pipeline System

Key Considerations

The introduction of TPA on the PTT pipeline system according to the cabinet resolution is in line with the policy on the restructuring of the power sector of the country, which promotes private power producers and competition in power generation via various options of fuel used. At present, 80% of the total gas consumption is used in power generation. In order that natural gas remains competitive with other types of fuel in power generation, the TPA policy is, therefore, very crucial as it will provide incentives for gas producers to increase their supply and private power producers will turn to use gas as fuel at a higher rate. It will also bring about the expansion of the gas market to cover other potential end users, for example, the industrial sector, small-business customers, and the transportation sector. This will eventually lead to the expansion of transmission and distribution pipeline systems to satisfy the increasing demand.

However, at present, the PTT transmission system is being operated at its full capacity to meet PTT's long-term contractual obligations to both producers and customers. As a result, TPA can only be practically introduced on new pipelines and PTT's pipelines of which surplus capacity is available.

Cabinet Resolution

The government approved in principle the introduction of TPA on the pipeline system. PTT still retains the rights to operate the existing pipeline system that has currently maximized its capacity. TPA will be introduced on the pipeline system where excess capacity is available and on new pipelines.

Services of transmission infrastructure for a third party under the TPA Code will be applicable to new pipeline systems, either of PTT or of other private individuals, with PTT being the sole operator of the pipeline networks connecting to the main system of PTT. This is to ensure the quality and efficiency of the transmission system.

Pipeline tariffs will transparently reflect actual costs and provide a fair rate of return.

In the part of pipeline system where TPA has been introduced, non-discriminatory services shall be provided, with clear and accountable rules and criteria. In this regard, if any producer constructs a pipeline which is part of the rights granted by the petroleum concession and which connects to the main pipeline, the utilization of that pipeline must also comply with the TPA Code.

The service quality must be in line with stipulated conditions, being technically sound and complying to the need of the majority of end users.

PTT and the Ministry of Industry (Department of Mineral Resources) have been assigned to draw up the TPA Code, specifying criteria, conditions, service quality, including name list of pipelines available to TPA, based on the principles given above. The draft TPA Code is to be presented to NEPO for further consideration and submission to the NEPC for final approval.

4.6.6 Definition of Existing Gas Supply and New Gas Supply

Key Considerations

Promotion of competition in the GSI should commence with the new gas supply so that there would be no impact on all PTT's existing gas purchase agreements or those under negotiation.

Since the GSI in Thailand is considered as a developing market, it is essential to have a long-term take-or-pay contract to accommodate the development of new gas supply in Thailand. Moreover, to develop a gas resource and to negotiate on a gas purchase is time-consuming; therefore, planning of gas supply to satisfy the consumption is deemed necessary and has to be carried out well in advance. At present, PTT, being responsible for procuring gas to meet the domestic demand, has already commenced negotiations with a number of new gas supply producers so as to acquire sufficient gas to supply to its contracted consumers or those under negotiation.

Therefore, the current definition of existing gas supply which means contracted gas supply may not adequately cover the PTT's commitments to its contracted or negotiated consumers. Besides, if the market is liberalised and new gas markets arise, producers may accelerate their production from the same concession as PTT's to supply gas to the new markets, resulting in reduced gas reserve in that concession. Hence, PTT may lack adequate gas supply to its customers in the amount and time contracted.

Cabinet Resolution

The Cabinet agreed on the following definition of existing gas supply and new gas supply:

> *"Existing gas supply means all domestic concessions which have contracted with PTT, including gas supply for which contracts are being negotiated, i.e. Bongkot 4, JDA, Yadana/Yetagun (extension)"*

Concessions other than those mentioned above are considered as new gas supply on which TPA is allowed.

Producers of the existing gas supply would be able to sell extended production volume to consumers other than PTT only after negotiation with PTT has been made to determine new gas purchase volume. A guarantee has to be made for gas supply to PTT according to the newly agreed volume, price and timing.

The definition of existing gas supply shall be voided only when the gas purchase agreements, in the form of Pool Gas, already made between PTT and gas producers/consumers expire.

PTT has been assigned to draw up detailed determination of existing gas supply and new gas supply in accordance with the principles prescribed above and present it to NEPO/NEPC for further consideration and approval.

In case PTT wishes to amend any contract with a gas producer so that the latter would be able to sell extended production volume to other consumers besides PTT, prior authorization from NEPO/NEPC will have to be obtained for PTT to undertake such a contract amendment.

4.6.7 Definition of Existing Gas Demand and New Gas Demand

Key Considerations

Promotion of competition in the GSI should commence with the new gas markets.

The existing gas purchase agreements between PTT and EGAT will expire in B.E. 2559 or A.D. 2016. According to the agreements under negotiation with EGAT and the purchase volume that EGAT has agreed in principle with PTT, the agreed volume corresponds to the average volume estimated by PTT for purchase negotiation with gas producers.

Cabinet Resolution

The definition of existing gas demand shall mean the following:

The existing gas purchase agreements between PTT and gas consumers, including gas purchase agreements between PTT and EGAT for Ratchaburi, Nam Phong, Nong Chok, and Surat Thani power plants.

The gas purchase agreements duly signed and those awaiting signing between PTT and IPPs for the first solicitation of power purchase from IPP, until the end of contracted terms.

The gas purchase agreements duly signed and those awaiting signing between PTT and SPPs for the current solicitation of power purchase from SPP, until the end of contracted terms.

The gas purchase agreements duly signed and those awaiting signing between PTT and consumers in the industrial sector, until the end of contracted terms.

Agreements other than those mentioned above are considered as the new gas demand for which consumers can opt to purchase gas from other resources than PTT.

4.6.8. Private Sector Participation in Investment and Operation of the Pipeline System

Transmission Pipelines Concesssions Key Considerations

New main transmission pipelines will be open to the private sector for bidding for investment or for construction and ownership of the infrastructure. This is to promote private participation in the development of the pipeline system and to reduce the investment burden of the public sector. PTT/PTT Plc's participation in such bidding should not be excluded. However, this implementation has to be regulated by the Ministry of Industry and NEPO/NEPC, or, in the future, the Independent Regulatory Agency.

Numerous operators of the pipeline system will be inefficient and may cause problems in maintaining balance of gas demand and supply. This will lead to instability of supply and affect quality of gas to meet end-users' demand.

As for the investment in the new pipeline system under the Natural Gas Pipeline System Master Plan, No. 2, which has been approved by NEPO/NEPC, PTT should be responsible for the investment. Should PTT require participation by private investors, the Ministry of Industry together with NEPO and NEPC will determine methods for private participation, for example, BOO (build-own-operate), BOT (build-operate-transfer), BOM (build-own-maintain), etc. depending on requirement and financial status of PTT.

Cabinet Resolution on Extent of Private Participation in the Main Pipeline System

The Cabinet has approved the extent of private participation in the pipeline system as follows:

- PTT Transmission will be the operator of gas pipeline networks connecting to the main system of PTT.
- Pipelines owned and operated by PTT comprise those specified in the Natural Gas Pipeline System Master Plan, No. 2, B.E. 2541-2549 (A.D. 1998-2006).

New pipelines not specified in the Master Plan, No. 2, which are open to competition are:

- Pipeline connecting the Gulf of Thailand to Ratchaburi, or the so-called third offshore pipeline
- Natuna pipeline
- Other new pipelines

Pipelines for which PTT may enter joint ventures with Petronas Co. of Malaysia and other private companies:

- JDA – Songkhla Pipeline

- JDA – Malaysia Pipeline

The principle for private participation in the main pipeline system investment will be based on competitive bidding under one of the following approaches depending on suitability of each individual project:

- Build-own-operate: BOO
- Build-operate-transfer: BOT
- Build-own-maintain: BOM
- Build-transfer-operate: BTO
- Leasing (invested and owned by the private sector; leased to PTT for operation)

In this regard, PTT/PTT Plc shall not be excluded from participation in the bidding for such projects. NEPO and the Ministry of Industry will jointly establish the bidding criteria, selection criteria, and key conditions of the contracts, including technical conditions and service quality.

Distribution Pipeline Key Considerations

Promotion is to be made to create competition in providing distribution pipeline services by granting a concession in each area via bidding on the build-own-operate (BOO) basis.

The distribution system will receive gas from the main transmission system and directly supply gas to customers. This part of the pipeline system can almost be wholly operated by the private sector without any impact on the main transmission system solely operated by PTT. Consequently, private sector participation in this part of the pipeline system will enhance quicker expansion of gas markets.

Cabinet Resolution

NEPO and PTT will jointly establish concession areas for distribution pipeline and issue solicitation for proposals. PTT/PTT Plc can participate in such bidding. Regulation on pipeline tariffs is required.

4.6.9 Regulation of the GSI

The regulation of the GSI should focus on:

- the structure of the industry so as to promote competition in the gas market and to provide all operators with non-discriminatory treatment, which will be beneficial to the country as a whole; the selection of qualified operators; and
- the regulation of pipeline tariff rates, investment and service quality via the issuance of licences.

The objectives of the regulation of the GSI are to:

- promote competition in the GSI;
- ensure transparent and fair determination of pipeline tariff rates for consumers, pipeline service operators and gas producers;
- increase efficiency of gas producers and service operators to be competitive in the long run;
- increase incentives in providing services;
- ensure efficiency of operators in all aspects -- technique, engineering and financial status;
- monitor safety, environmental impact, and service quality.

The establishment of the Independent Regulatory Agency is time consuming as it requires amendment of relevant legislations, training of human resources, and time for respective approval procedures of various pieces of legislation. This may hinder the restructuring of the GSI from happening simultaneously with the restructuring of the power sector of the country.

The regulation of the GSI would be divided into two phases, i.e. short-term regulation and long-term regulation.

Short-Term Regulation

Under the State Enterprise Corporatisation Act, PTT will be corporatised into PTT Co., Ltd./(Plc) and the PTT Act will be repealed. However, Section 26 of the Corporatisation Act specifies that PTT Plc still retain the rights according to the PTT Act as deemed appropriate by the government. In such a case, conditions are to be determined for PTT Plc. to retain such rights so that PTT Plc and the Ministry of Industry could temporarily regulate the industry in collaboration with NEPO until the Independent Regulatory Agency is established.

Long-Term Regulation

When the Independent Regulatory Agency is established, it will regulate the issuance of licences for each part of the GSI: transmission, distribution, supply & marketing, including the pipeline tariff rates, investment, service quality and safety.

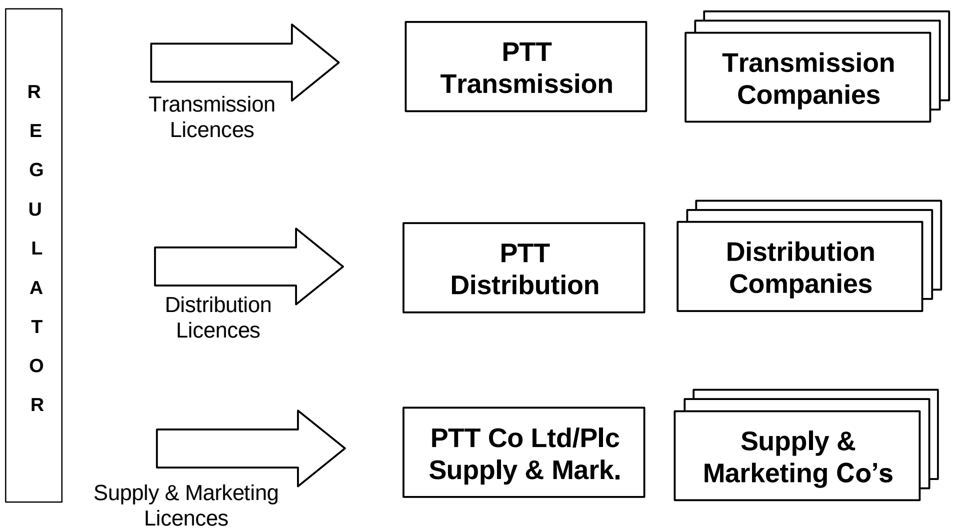


Figure 17: Long Term Regulation of the GSI

4.7 Petroleum Authority of Thailand (PTT)

4.7.1 PTT Corporate Structure

On 23 January 1996, cabinet approved the strategy for restructuring the Petroleum Authority of Thailand (PTT) and for the promotion of a liberalised petroleum market. Consent was given to the corporatisation of PTT Oil, PTT International and PTT Gas, all owned by PTT, by the end of 1996. Some parts of these newly established companies would then be privatised as deemed appropriate, through listing on the Stock Exchange of Thailand (SET) during 1997-1998. This would be directed by an implementation plan that would be derived from a study on the detailed privatisation process.

PTT has engaged a number of financial advisors to carry out a detailed study on various methods for privatisation and public offering. Meanwhile, NEPO has also engaged Dresdner Kleinwort Benson and London Economics to carry out a study on PTT privatisation and the deregulation of the natural gas supply industry.

PTT Corporate Restructuring and Privatisation Plan has been agreed by PTT and NEPO and is awaiting final government approval. Upon government approval, the process of PTT comporatisation could begin. In parallel, the various rules and regulations for the natural gas deregulation program would be drawn up, and finally announced before public offering of PTT Co.Ltd. shares at the end of 1999 or early 2000.

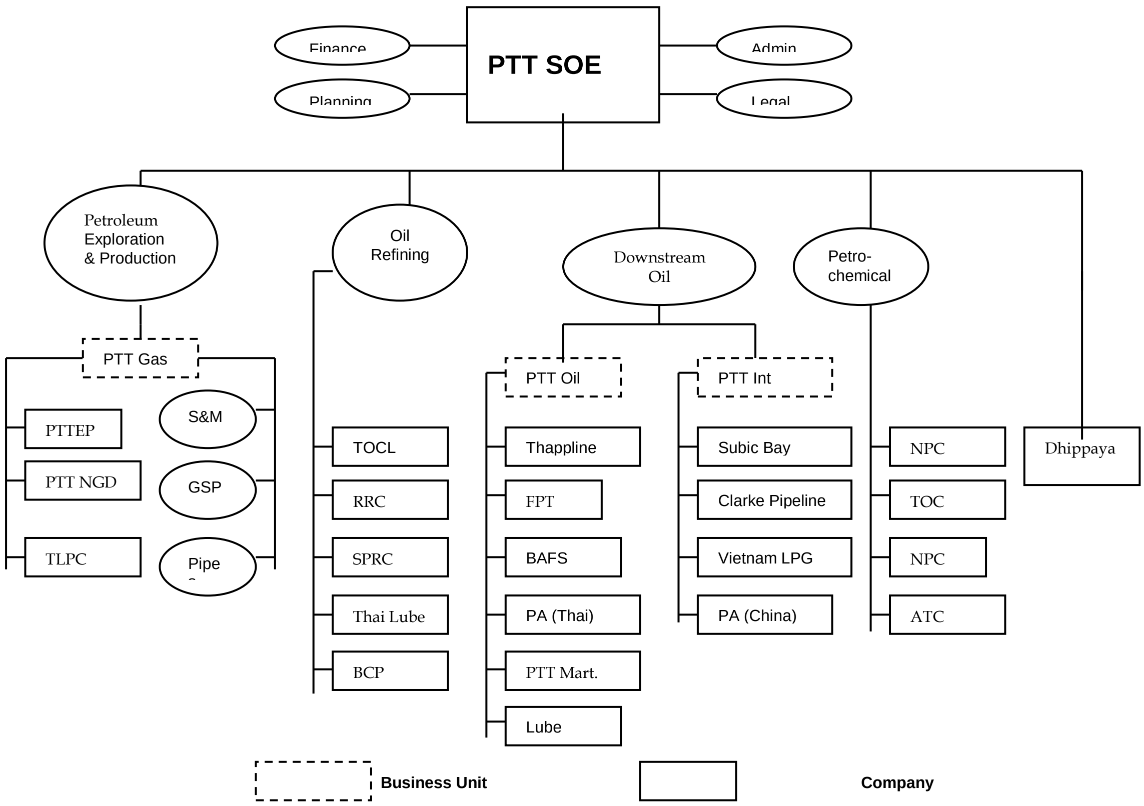


Figure 18: Existing Structure of PTT

4.7.2 Structure of PTT's Gas Operations

To comply with the directions of the long-term restructuring of the GSI, the implementation of the structure of PTT Gas Business Unit should be based on the following:

- PTT Gas shall remain as a business unit of PTT/PTT Plc, responsible for the gas supply & marketing and the gas separation plant (GSP) business;
- PTT Transmission Co., Ltd. is to be established, with PTT/PTT Plc holding 100% of shares, responsible for the operation of the PTT transmission pipeline system and other investors' pipelines to be connected to the PTT's transmission network.

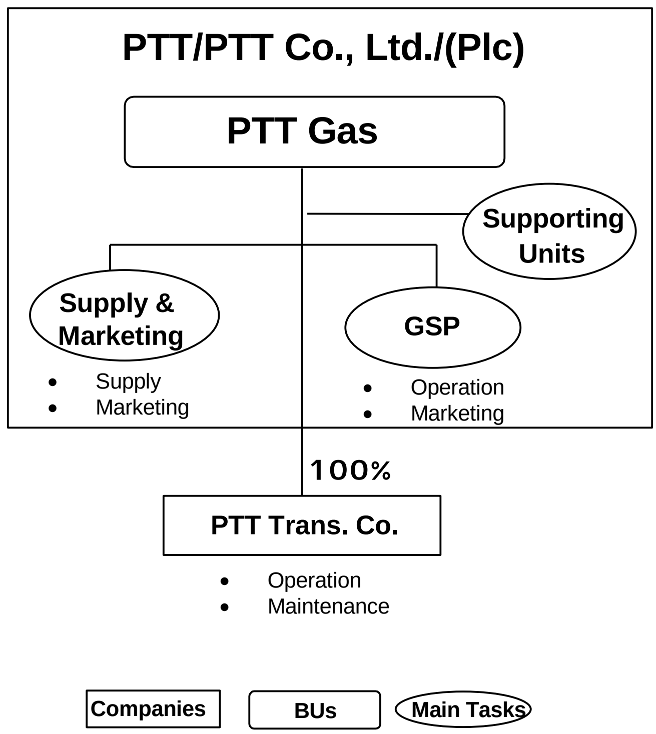


Figure 19: Proposed Structure of PTT Gas

4.7.3 Structure of PTT's Downstream Oil Operations

The current structure of the PTT's downstream oil operations is fragmented, particularly in the refining business where the PTT owns equity interests in four refineries but controls none. NEPO agrees with PTT that if the downstream oil operaitons are to be competitive in the current market, PTT Oil must address the fundamental problems associated with the fragmented nature of its operations. Failure to do so will not only affect the business unit's performance and its long term growth potential but more immediately have a damaging impact of any PTT privatisation. To address this problem, PTT proposes the integration of Refining and Marketing operations – it has been proposed that PTT should secure a controlling interest in Thai Oil. This interest would then be used as the centre of supply operations, which could in turn, be more easily integrated with the existing marketing operations.

However, there are some concerns over specific aspects of the corporate restructuring process. The main area of concern relates to the specific issue of Thai Oil. Resolution of the current Thai Oil situation – in the past a number of options have been presented such as a forced rights issue, the issue of a convertible bond to PTT or even a combination of primary and secondary offerings to the market. These options have proved to be non executable in the short term. The best interests of all parties can be served by the introduction of a third party to buy the Chowkwanyum family stake. Subsequent rights issue, in which PTT would participate in order to maintain its stake, would be made to recapitalise Thai Oil.

4.7.4 PTT Privatisation

The cabinet resolution of 23 January 1996 approved the strategy for PTT privatisation by corporatizing PTT Oil, PTT International, and PTT Gas which initially would be wholly owned by PTT.

PTT has engaged nine consultant companies to study and recommend the most suitable privatisation structure for PTT in order to acquire the most appropriate structure for the management, operation, and financial strategy.

PTT's financial advisors (FAS) have recommended that the integrated structure of the organization would be most suitable and beneficial to PTT in the long run. Especially, under the current situation, privatisation through integrated IPO or public offering of PTT at the public company level should be the most suitable and beneficial approach. In addition, this approach will be acceptable to all parties concerned in PTT privatisation. PTT has, therefore, adopted the recommendation of the nine FAS on privatisation using the integrated structure option, based on the directions specified in the State Enterprise Corporatisation Act, to transform PTT, a state enterprise, to PTT Co., Ltd./(Plc). Should the market conditions become suitable, the company will then be listed on the stock market.

The advantages of the integrated IPO option can be summarized as follows:

Operational strategy

Under the integrated IPO approach of privatisation, PTT will be able to incorporate common benefits of its various business units and hence will be helpful in competing with foreign oil companies having worldwide networks.

Benefits resulting from reciprocal support amongst businesses

PTT's business units are all interrelated. Therefore, PTT's fund raising at the holding company level can be carried out while the benefits of PTT's main businesses are maintained via PTT Gas, PTT Oil, and PTT International, with no conflicts of interest. This will bring about flexibility in decision making and most efficient long-term planning.

Financial strength and flexibility

To privatize PTT using the integrated IPO structure will increase PTT's financial credit worthiness since the cash flow from the business units with good rates of return can be switched to support the underperforming business units. By so doing, PTT's overall liability payment ability will be high, which in turn will lower the financial cost while shareholders' return will increase. The overall PTT's capital structure will be most appropriate.

Value to be gained from fund raising

It is likely that investors' interest in PTT privatisation via integrated IPO will increase due to the following factors:

- Investors' acceptance of the offering of large-scale assets with wide operational networks because they are assured of the viability of the business under the highly volatile economic situation;
- Future operational plan of PTT which has allocated the majority of investment to business units with high rates of return, e.g. PTTEP and PTT Gas;
- Preparation to improve the investment plan and operation of subsidiaries facing financial problems, which will bring about positive impact on the overall performance of PTT should the improvement reaches the target set;
- Overall growth trend of PTT which remains high compared with other integrated companies.

Human resource management and employees' acceptance

PTT privatisation via public offering of PTT Co., Ltd./(Plc) will lead to efficient management of human resources and will be most acceptable to the majority of employees.

Ease of Implementation

Pure Holding Company, under which PTT has to create new subsidiaries under the civil and commercial code and will have to re-negotiate with all contractors for their consent; amendment and transfer of contracts will have to be made, switching from PTT state-owned enterprise to the three subsidiaries prior to the actual establishment of the three subsidiaries. This is very time consuming.

The option complies with the objective of the State Enterprise Corporatisation Act in that it facilitates immediate implementation of PTT privatisation under the integrated structure with no need to negotiate with any contractors for consent to amend or transfer contracts because the corporatisation will be the natural consequence of the legislation;

On 16 September 1998 the PTT Board passed a resolution agreeing with the integrated structure and the organizational structure as an Operating Holding Company. The structure has been adjusted to correspond to the trend of the GSI liberalization, separating the transmission from the supply & marketing business, as shown in the following figure.

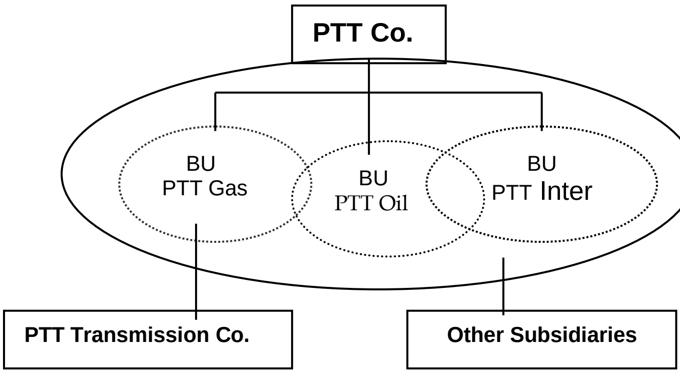


Figure 20: Proposed Organisational Structure for PTT Privatisation

5. Regulatory Framework

5.1 Energy Sector Regulatory Framework

In 1997, NEPO commissioned the consulting firm London Economics to prepare a set of recommendations for a regulatory framework for the energy sector. The project was initiated as a response to the changing regulatory needs of a sector undergoing significant growth and development in addition to the reform and restructuring process. The project would help design and commence the establishment of an independent regulatory office as well as reviewing the required functions of such an economic regulatory body for the energy sector.

Phase I of the project, which was completed in late 1997, reviewed existing and future regulatory functions arising from the structural changes being implemented and developed recommendations for appropriate regulatory responses for the short to medium term transition phase.

Phase II of the project, which was completed in mid 1998 presented a recommended design for an independent regulatory agency as well as providing a number of the requisite legal instruments to enable the agency. This phase also reviewed NEPO’s existing regulatory capacity and advised on the directions required to enable NEPO to regulate effectively during the transitional phase to an independent regulator.

Recommendations arising from the project include:

- the establishment of an independent regulatory office responsible for the power and gas sectors
- the office will be headed by 5 commissioners, serving limited tenure.
- primary legislation will include an enabling act which passes requisite powers to the regulatory office
- regulation to be achieved through the use of secondary legislation i.e. licences and will be light-handed, conduct based where possible
- price regulation to be initially based on a CPI-X based revenue cap

The Regulatory Office will be established through a new Energy Law, which is expected to be enacted within 5 years. During the transition phase, NEPO will establish an institutional capability to both manage the process of implementing an independent regulatory office and undertake those regulatory activities and functions necessary. During this transition phase, these activities and functions will include:

- oversight of licenses
- development of regulatory rules
- network tariff calculation
- oversight of distribution functions
- technical standards/quality of service
- oversight of PPA’s
- electricity load research
- preliminary policy work on power pool
- oversight of gas contracts
- monitor margins pre competition in the gas sector

5.2 The State Enterprise Corporatisation Act

The State Enterprise Corporatisation bill has been approved by both the House of Representatives and the Senate, and is expected to become law in April/May 1999. The Act will be an important policy instrument for the government to speedily corporatise and privatise state enterprises.

The Act allows the government to transform any state enterprise not already registered as a company under the Commercial and Civil Code into a company wholly owned by MoF by issuing a Royal Decree. This avoids the lengthy process of passing a legislation to transform each state enterprise created by an act of Parliament in order to transform it into company.

The process of corporatisation will be implemented under the guidance of the Corporatisation Policy Committee chaired by the Prime Minister. Committee members include ministers appointed by the Prime Minister, Director of the Budget Bureau, Secretary General of the Council of State, Secretary General of NESDB, and at most 6 experts with the Permanent Secretary of MoF on member and secretary of the Committee. If the Committee and the Cabinet have approved in principle the corporatisation of any state enterprise, then a Company Establishment Committee (CEC) will be set up to implement the corporatisation of the state enterprise. CEC members includes permanent secretary of the ministry in charge of the state enterprise, permanent secretary of MoF, CEO of the state enterprise as well as the leader of the state enterprise labour union.

Upon corporatisation of any state enterprise, the state enterprise establishment act will be automatically repealed, and rights and privileges of the state enterprise in the act may be transferred to the new company or to an "interim independent regulatory committee" as deemed appropriate. This interim independent regulatory committee could either be an existing body or a newly established body.

The interim independent regulatory committee will cease to function once a comprehensive industry regulatory act is issued together with an establishment of a permanent regulatory body.

6. Private Sector Participation in New Projects

6.1 IPP and SPP Solicitation

Given the current economic slowdown and commitments already made by EGAT and the Thai government to buy power from a number of IPPs, SPPs and power projects in Lao PDR, new generation capacity would not be needed until 2008.

	Base/Intermediate Load (MW)	South (MW)
2008	600	300
2009	1,800	300
2010	1,600	-
2011	1,600	300

Figure 21: New IPP/SPP Capacity Requirement

This means that, under the single buyer model, the next IPP/SPP solicitation may not be required until 2003 for new capacity for the year 2008. However, if competition in the power supply industry can be established in accordance to the schedule in the Privatisation Master Plan, then there would be no request for proposal in the future, but new capacity expansion would be left to the market.

New power generating plants to be built by EGAT under EGAT's PDP 99-01, approved by Cabinet on 16 February 1999, are Krabi thermal power plant (600 MW), Suratthani Combined Cycle (300 MW), Chulaporn and Kiritran pump storage. The Ratchaburi power plant and Lam Takong pump storage power plant are currently under construction.

6.2 Renewable Energy Projects

The only type of SPP project permitted to submit proposals to EGAT is SPP's using renewable energy as fuels. The potential is still vast as there still remain untapped resources eg. municipal waste, palm oil waste, paddy husk and other agriculture wastes.

6.3 Power Projects from Neighbouring Countries

Apart from developing power projects in Lao PDR for power sale to Thailand, in the long term there is considerable prospect for development of power projects in China and Myanmar.

6.3.1 Power Purchase from China

The Asian Development Bank (ADB) estimates that the Yunnan province of China has hydropower generating capability of 90,000 MW. Lancang (Mekong) river has a total potential of 22,260 MW. Manwan dam (1,500 MW) is already in operation. A second dam is under construction. A possible project for power sale is the Jing Hong project:

- Capacity : 1,500 MW with 1,200 MW for sale to Thailand
- Investor : MDX/Yunnan Electric
- 400 kms. from Thai border

6.3.2 Power Purchase from Myanmar

Myanmar also has large hydro potential. More natural gas has also been discovered. Technical potential for hydropower development is 100,000 MW. Preliminary studies by Myanmar government on 196 projects indicate a total capacity of 38,000 MW. MOU between

Thailand and Myanmar was signed in July 1997 whereby Thailand has agreed to buy up to 1,500 MW of power from Myanmar by 2010.

Potential Projects include:

• Nam Kok (MDX/Italthai/Marubeni):	42 MW	Hydro
• Hutyi (lower Salween):	300 MW	Hydro
• Tasang	3,600 MW	Hydro
• Kanbauk	1,500 MW	Combined Cycle

6.4 Natural Gas Pipeline

Deregulation of the GSI can commence with the opening of gas transmission system to private investment. Potential projects for private investment are those not in the current PTT Natural Gas Master Plan, for instance the Erawan-Ratchaburi pipeline (3rd offshore pipeline) which has a capacity of 2,000 mmscfd with estimated investment of US$ 1,000 million.